

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD
POND SEALING OR LINING SOIL DISPERSANT

(No.)

CODE 521B

DEFINITION

A liner for a pond or waste impoundment consisting of a compacted soil-dispersant mixture.

Sites with highly permeable material or fractured bedrock must be evaluated by a geologist or other individual with similar training.

Dispersant treated soil liners shall comply with all federal, state, and local laws, rules, and regulations.

PURPOSE

To reduce seepage losses from ponds or waste impoundments for water conservation and environmental protection.

Lined structures shall meet all applicable NRCS standards.

Dispersant treated soil liners shall be filter compatible with the natural foundation materials on which they are compacted according to Chapter 26, Part 633 of the National Engineering Handbook.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- Soils are suitable for treatment with dispersants.
- Ponds or waste impoundments require treatment to reduce seepage rates and/or to impede the migration of contaminants to within acceptable limits.

Soil Properties

For chemical sealing, soils shall have properties approximating the following:

1. At least 50 percent finer than 0.074 mm diameter (No. 200 sieve)
2. At least 15 percent finer than 0.002 mm diameter
3. Less than 0.50 percent soluble salts (based on dry soil weight)

CRITERIA

GENERAL CRITERIA

Ponds to be lined shall be constructed to meet the Virginia Conservation Practice Standards *Irrigation Pit or Regulating Reservoir (Code 552)*, *Irrigation Storage Reservoir (Code 436)*, *Pond (Code 378)*, *Waste Treatment Lagoon (Code 359)*, or *Waste Storage Facility (Code 313)*.

Dispersants

Tetrasodium pyrophosphate (TSPP) and sodium tripolyphosphate (STPP) shall be used in preference to other polyphosphate salts. Commercial phosphatic fertilizer is not acceptable. Soda ash, technical grade, 99-100 percent sodium carbonate may be used.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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These dispersants shall be finely granular; 95 percent of the material shall pass a number 30 sieve and less than 5 percent shall pass a number 10 sieve.

Standard commercial sodium chloride is satisfactory in the granulated form.

Other dispersants may be used in the form found to be satisfactory by local experience or laboratory testing.

Safety

For protection against dispersant dust, personnel on site during dispersant application and mixing shall wear mask and goggles.

CRITERIA APPLICABLE TO WASTE IMPOUNDMENTS

Design

Design of dispersant treated soil liners for waste impoundments shall be in accordance with National Engineering Handbook Series, Part 651, Agricultural Waste Management Field Handbook, Chapter 10, Appendix 10D, and/or state regulatory requirements.

Liner Thickness

The minimum thickness of the finished compacted liner shall be 6 inches.

Liner Protection

The liner shall be protected against desiccation cracking, the effects of water surface fluctuations, wave action, surface erosion, erosion from pipe inlets, agitation equipment, animals, or items installed through the liner. Protective measures shall be designed into the system to protect the liner for these cases. As a minimum, at least 12 inches of soil shall be placed over the soil-dispersant liner.

CRITERIA APPLICABLE TO PONDS

Application Rate

For ponds, in the absence of laboratory tests or field performance data on soils similar to those to be treated, the minimum application of dispersant per 6-inch thickness of constructed liner shall be:

Dispersant Type	Application Rate lb./100ft
Polyphosphates	7.5
Soda Ash	15

Liner Thickness

In the absence of more detailed testing and analyzes, liner thickness shall be according to the following table:

Water Depth (feet)	Liner Thickness (inches)
8 or less	6
8.1 – 16	12
16.1 – 24	18
24.1 – 30	24

CONSIDERATIONS

Flattening the slopes of ponds or waste impoundments to facilitate compactive efforts during construction should be considered. The stair-step method of construction as outlined in Agricultural Waste Management Field Handbook, Appendix 10D, may be considered in lieu of slope flattening.

A protective compacted soil cover should be considered for protecting the soil-dispersant lines for ponds.

Consider using a flexible membrane liner for sites that have water depths greater than 24 feet.

PLANS AND SPECIFICATIONS

Plans and specifications for dispersant treated soil liners for ponds and waste impoundments shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Plans and specifications shall include such drawings, specifications, material requirements, quantities, construction requirements, equipment requirements, and other documents as are necessary to describe the work to be done.

CONSTRUCTION

1. The area to be treated shall be cleared of all vegetation and trash and all stones or other objects large enough to interfere with operation of the compacting equipment.
2. The moisture content of the soil must be near optimum for compacting.
3. Sealing chemicals shall be distributed evenly over the surface to be treated with a drill, seeder, or fertilizer spreader or by hand broadcasting. If broadcast by hand, the area must be staked or otherwise marked in grids of 100 square feet.
4. The chemicals shall be thoroughly mixed into the 6 to 8 inch thick layer of soil being treated. Mixing shall be done with disk, rototiller, pulverizer, or similar equipment. A second mixing shall be perpendicular to the first mixing.
5. If the moisture is inadequate for maximum compacting, water shall be added by sprinkling during the mixing operation. If the soil moisture content is too high, dry by air and disking.
6. Each treated layer of soil shall be compacted to a dry density of 90 percent or more of maximum standard Proctor density with the soil at optimum or slightly higher moisture content.
7. Treated areas shall be protected from puncture by livestock trampling. Areas near the normal waterline and at points of concentrated surface flow into the pond shall be protected against erosion.

8. Sediment coagulating chemicals, such as gypsum or iron sulfate, shall not be used to clear reservoir water after treatment.
9. Construction shall be carried out in such a manner that erosion and air and water pollution minimized. The completed job shall present a workmanlike finish.

DESIGN DATA

1. Statement concerning location and type of leaks to be treated
2. Gradation and classification of soils to be sealed
3. Description of foundation preparation to be made
4. Rate of application and thickness of the treated blanket
5. Method of mixing materials
6. Method of compaction and protection

CHECK DATA

1. A statement of conformance to design with all exceptions noted
2. A statement of the degree of effectiveness of the treatment

OPERATION AND MAINTENANCE

Maintenance activities required for this practice consist of those operations necessary to prevent damaging the treated soil liner. This includes, but is not limited to, excluding animals and equipment from the treated area, protection of the liner during initial filling, agitation, or pumping operations, and repair of disturbed or eroded areas.

REFERENCES

1. Engineering Field Manual, Chapter 4, "Elementary Soil Engineering" and Chapter 11, "Ponds and Reservoirs".

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2. National Engineering Handbook, Chapter 26, Part 633.
3. National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook, Chapter 10, Appendix 10D.
4. State regulatory requirements.
5. NRCS, VA, Field Office Technical Guide (FOTG), Section IV.

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Approved Practice Narratives

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521B D1 Pond Sealing or Lining, Soil Dispersant: A soil dispersant shall be used to seal or line a pond in accordance with the attached design.

521B D2 Pond Sealing or Lining, Soil Dispersant: A soil dispersant shall be used to seal or line a manure impoundment, in accordance with the attached design.

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